

## Abstract

Reduced-rank restrictions can add useful parsimony to coefficient matrices of multivariate models, but their use is limited by the daunting complexity of the methods and their theory. The present work takes the easy road, focusing on unifying themes and simplified methods. For Gaussian and non-Gaussian (GLM, GAM, mixed normal, etc.) multivariate models, the present work gives a unified, explicit theory for the general asymptotic (normal) distribution of maximum likelihood estimators (MLE). MLE can be complex and computationally hard, but we show a strong asymptotic equivalence between MLE and a relatively simple minimum (Mahalanobis) distance estimator. The latter method yields particularly simple tests of rank, and we describe its asymptotic behavior in detail. We also examine the method's performance in simulation and via analytical and empirical examples.